

**What is claimed is:**

1. A process for the production of a strongly adherent metal coating on an inorganic or organic substrate, wherein

a) a low temperature plasma treatment, a corona discharge treatment or a flame treatment is carried out on the inorganic or organic substrate,

b) one or more photoinitiators or mixtures of photoinitiators with monomers or/and oligomers, containing at least one ethylenically unsaturated group, or solutions, suspensions or emulsions of the afore-mentioned substances, are applied to the inorganic or organic substrate,

c) the layer of step b) is optionally dried and is irradiated with electromagnetic waves; and

d) on the substrate so precoated with photoinitiator a metal, half-metal or metal oxide is deposited from the gasphase.

2. A process according to claim 1, wherein step d) an irradiation with electromagnetic waves is carried out, either while depositing the metal, half-metal or metal oxide from the gasphase or after the deposition.

3. A process according to claim 1, wherein the photoinitiator is a compound or combination of compounds from the classes of benzoines, benzil ketals, acetophenones, hydroxyalkylphenones, aminoalkylphenones, acylphosphine oxides, acylphosphine sulfides, acyloxyiminoketones, peroxy compounds, halogenated acetophenones, phenylglyoxylates, dimeric phenylglyoxalates, benzophenones, oximes and oxime esters, thioxanthenes, thiazolines, ferrocenes, coumarins, dinitrile compounds, titanocenes, sulfonium salts, iodonium salts, diazonium salts, onium salts, borates, triazines, bisimidazoles, polysilanes and dyes, and also corresponding coinitiators and/or sensitisers.

4. A process according to claim 1, wherein the photoinitiator is a compound of formula I or Ia



wherein

**(IN)** is a photoinitiator base structure;

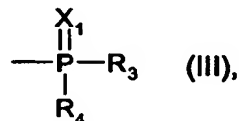
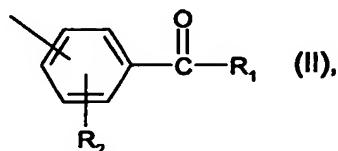
**A** is a spacer group or a single bond;

**(RG)** is hydrogen or at least one functional ethylenically unsaturated group; and

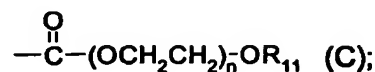
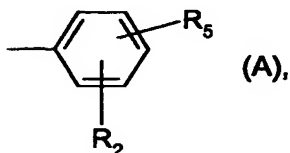
(RG') is a single bond or a divalent radical that contains at least one functional ethylenically unsaturated group, or is a trivalent radical.

5. A process according to claim 4, wherein in the compound of formula I or Ia

(IN) is a photoinitiator base structure of formula (II) or (III)



R<sub>1</sub> is a group (A), (B), (C) or (III)



n is a number from 0 to 6;

R<sub>2</sub> is hydrogen, C<sub>1</sub>-C<sub>12</sub>alkyl, halogen, the group (RG)-A- or, when R<sub>1</sub> is a group (A), two

radicals R<sub>2</sub> in the ortho-position to the carbonyl group may also together be -S- or  $\text{—}\overset{\text{O}}{\parallel}\text{C—}$  ;

R<sub>3</sub> and R<sub>4</sub> are each independently of the other C<sub>1</sub>-C<sub>6</sub>alkyl, C<sub>1</sub>-C<sub>6</sub>alkanoyl, phenyl or benzoyl, the radicals phenyl and benzoyl each being unsubstituted or substituted by halogen, C<sub>1</sub>-C<sub>6</sub>alkyl, C<sub>1</sub>-C<sub>6</sub>alkylthio or by C<sub>1</sub>-C<sub>6</sub>alkoxy;

R<sub>5</sub> is hydrogen, halogen, C<sub>1</sub>-C<sub>12</sub>alkyl or C<sub>1</sub>-C<sub>12</sub>alkoxy or the group (RG)-A- ;

R<sub>6</sub> is OR<sub>9</sub> or N(R<sub>9</sub>)<sub>2</sub> or is  $\text{—N—}$  (cyclohexyl),  $\text{—N—NH—}$  (piperidine),  $\text{—N—N—R}_{10}$  (piperazine),  $\text{—N—O—}$  (morpholine) or

SO<sub>2</sub>R<sub>9</sub>;

R<sub>7</sub> and R<sub>8</sub> are each independently of the other hydrogen, C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>2</sub>-C<sub>12</sub>alkenyl, C<sub>1</sub>-C<sub>12</sub>alkoxy, phenyl or benzyl or R<sub>7</sub> and R<sub>8</sub> together are C<sub>2</sub>-C<sub>6</sub>alkylene;

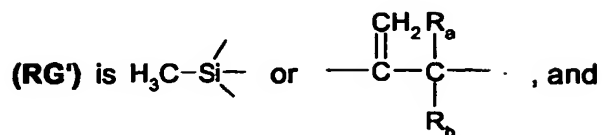
R<sub>9</sub> is hydrogen, C<sub>1</sub>-C<sub>6</sub>alkyl or C<sub>1</sub>-C<sub>6</sub>alkanoyl;

R<sub>10</sub> is hydrogen, C<sub>1</sub>-C<sub>12</sub>alkyl or phenyl;

R<sub>11</sub> is C<sub>1</sub>-C<sub>4</sub>alkyl or  $\text{—C(=O)—C(=O)—}$  (benzene ring with R2 and R5 substituents); and

X<sub>1</sub> is oxygen or sulfur.

6. A process according to claim 5, wherein in the compound of formula I or Ia (RG) is  $R_cR_bC=CR_a$ ;



$R_a$ ,  $R_b$  and  $R_c$  are each independently of the other hydrogen or  $C_1$ - $C_8$ alkyl, especially hydrogen or methyl.

7. A process according to any one of the preceding claims 1 to 6, wherein the photo-initiator(s) or mixtures thereof with monomers or oligomers are used in combination with one or more liquids (such as solvents or water) in the form of solutions, suspensions and emulsions.

8. A process according to either claim 1 or claim 2, wherein an inert gas or a mixture of inert gas with reactive gas is used as the plasma gas.

9. A process according to claim 8, wherein air,  $H_2$ ,  $CO_2$ , He, Ar, Kr, Xe,  $N_2$ ,  $O_2$  or  $H_2O$  are used singly or in the form of a mixture.

10. A process according to claim 1, wherein the photoinitiator layer applied has a layer thickness of up to 500 nm, especially ranging from a monomolecular layer up to 200 nm.

11. A process according to claim 1, wherein process step b) is carried out immediately after process step a) or within 24 hours after process step a).

12. A process according to claim 1, wherein the concentration of photoinitiator or photoinitiators in process step b) is from 0.01 to 99.5 %, preferably from 0.1 to 80 %.

13. A process according to claim 1, wherein process step c) is carried out immediately after process step b) or within 24 hours after process step b).

14. A process according to claim 1, wherein drying in process step c) is effected in ovens, with hot gases, heated rollers or IR or microwave radiators or by absorption.

15. A process according to claim 1 or claim 2, wherein irradiation in process step c) and/or d) is effected with a source that emits electromagnetic waves of wavelengths in the range from 200 nm to 700 nm, or by electron beams.

16. A process according to claim 1, wherein portions of the photoinitiators, or mixtures thereof with monomers and/or oligomers, applied in process step b) that have not been crosslinked after irradiation in process step c) are removed by treatment with a solvent and/or water and/or mechanically.

17. A process according to claim 1, wherein after irradiation in process step d) portions of the coating are removed by treatment with a solvent and/or water and/or mechanically.

18. Use of a photoinitiator, especially an unsaturated photoinitiator, in a process according to any one of the preceding claims 1 to 17.

19. A strongly adherent coating obtainable by a process according to any one of the preceding claims 1 to 17.